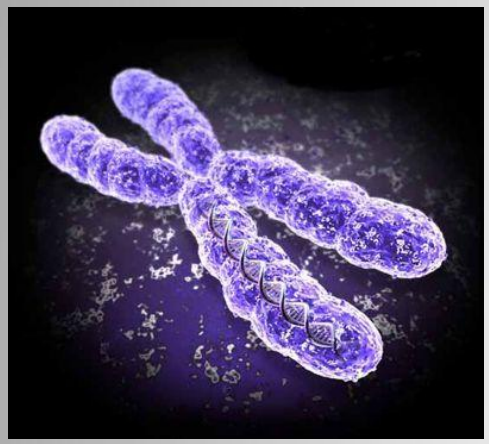
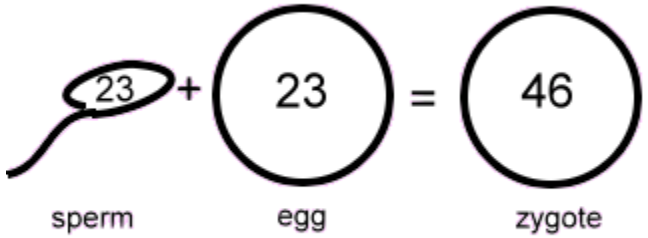


MEIOSIS

MEIOSIS

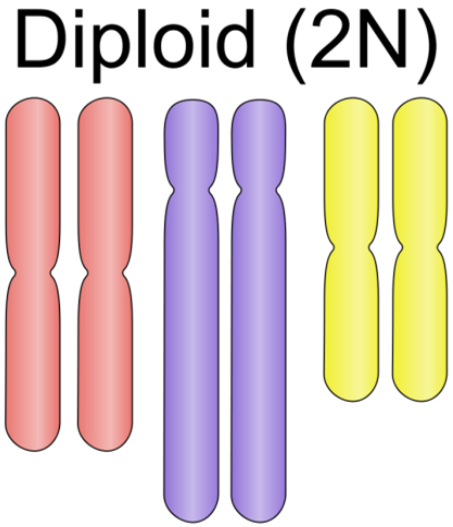
- The form of cell division that makes GAMETES (eggs or sperm)
- Used in SEXUAL reproduction.
- TWO divisions (MEIOSIS I and MEIOSIS II).



Somatic Cells vs. Gametes

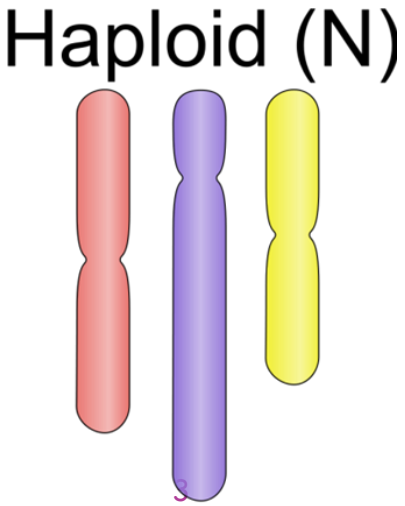
Somatic Cells

- all cells except sex cells
- Diploid- contain 2 of each type of chromosome (one from mom and one from dad
- Made during mitosis



Gametes

- Eggs and sperm
- Haploid- contain one of each kind of chromosome
- Made during meiosis



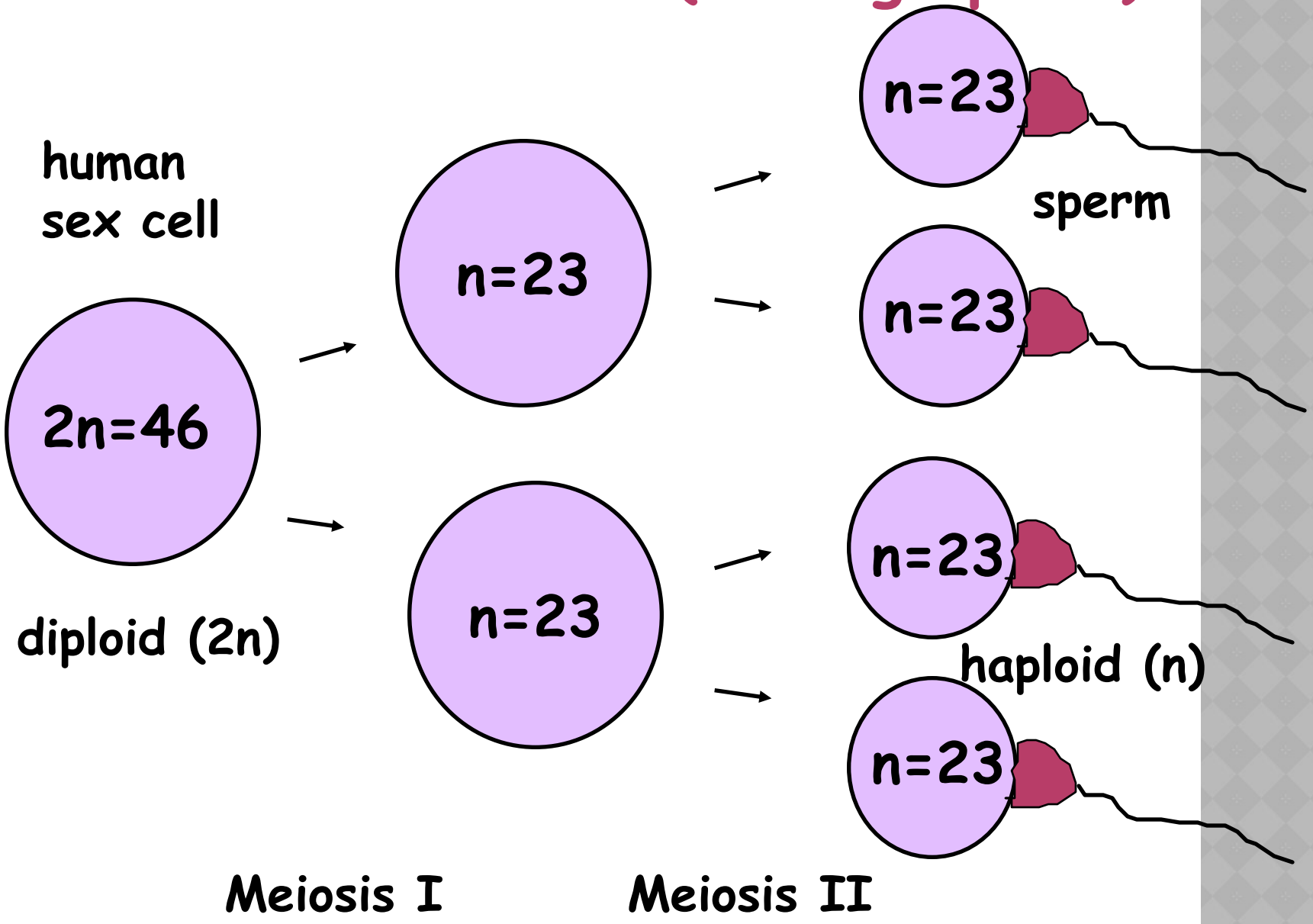
PRODUCING GAMETES

- Male: SPERMATOGENESIS
  -makes sperm

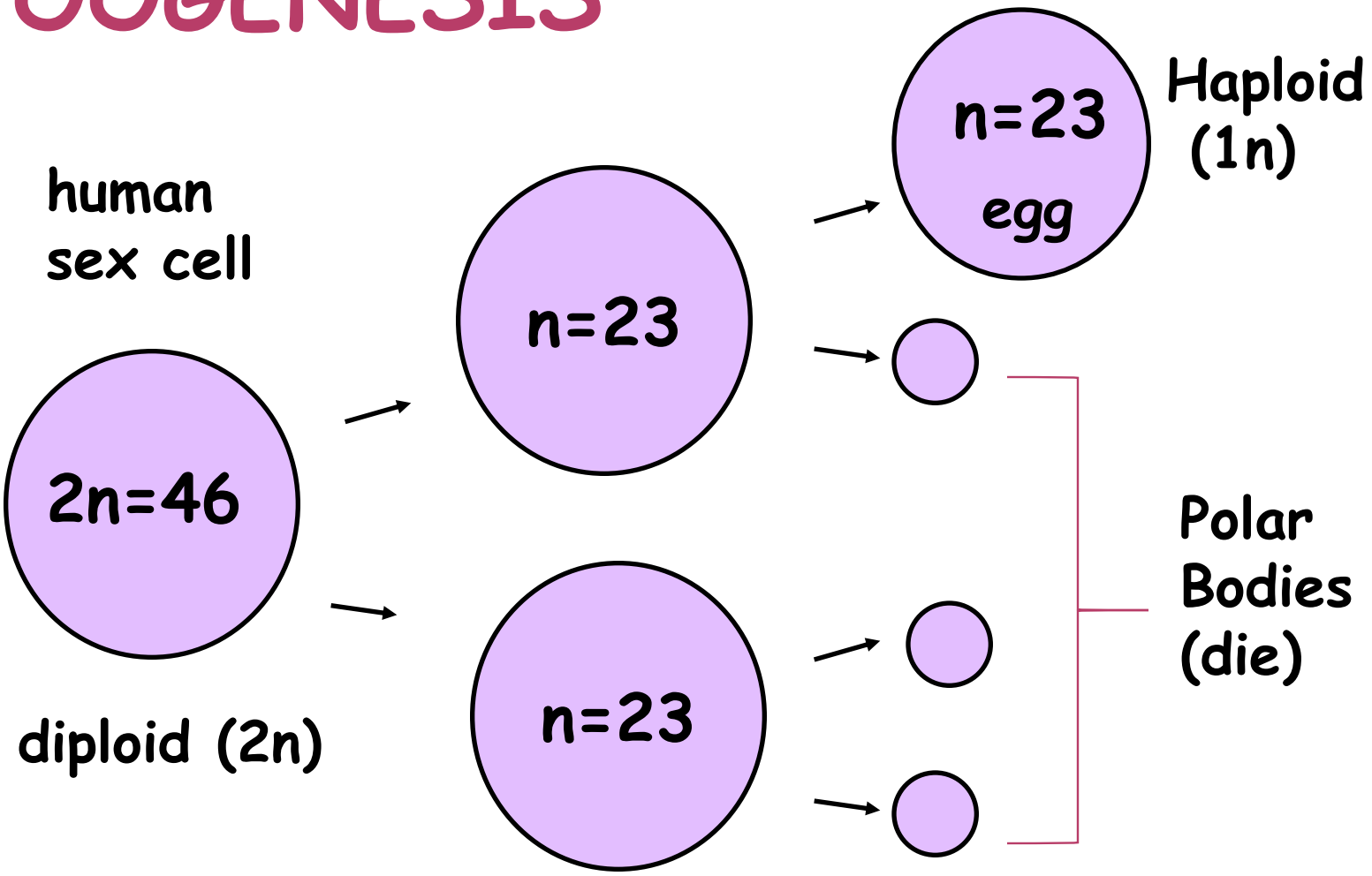
- Female: OOGENESIS - egg

  or ova

SPERMATOGENESIS (making sperm)

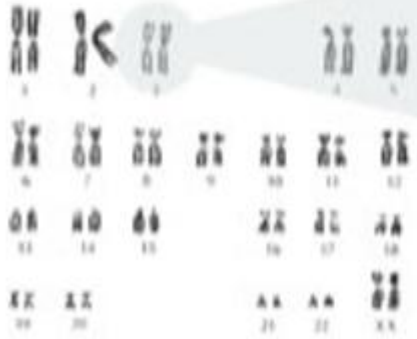


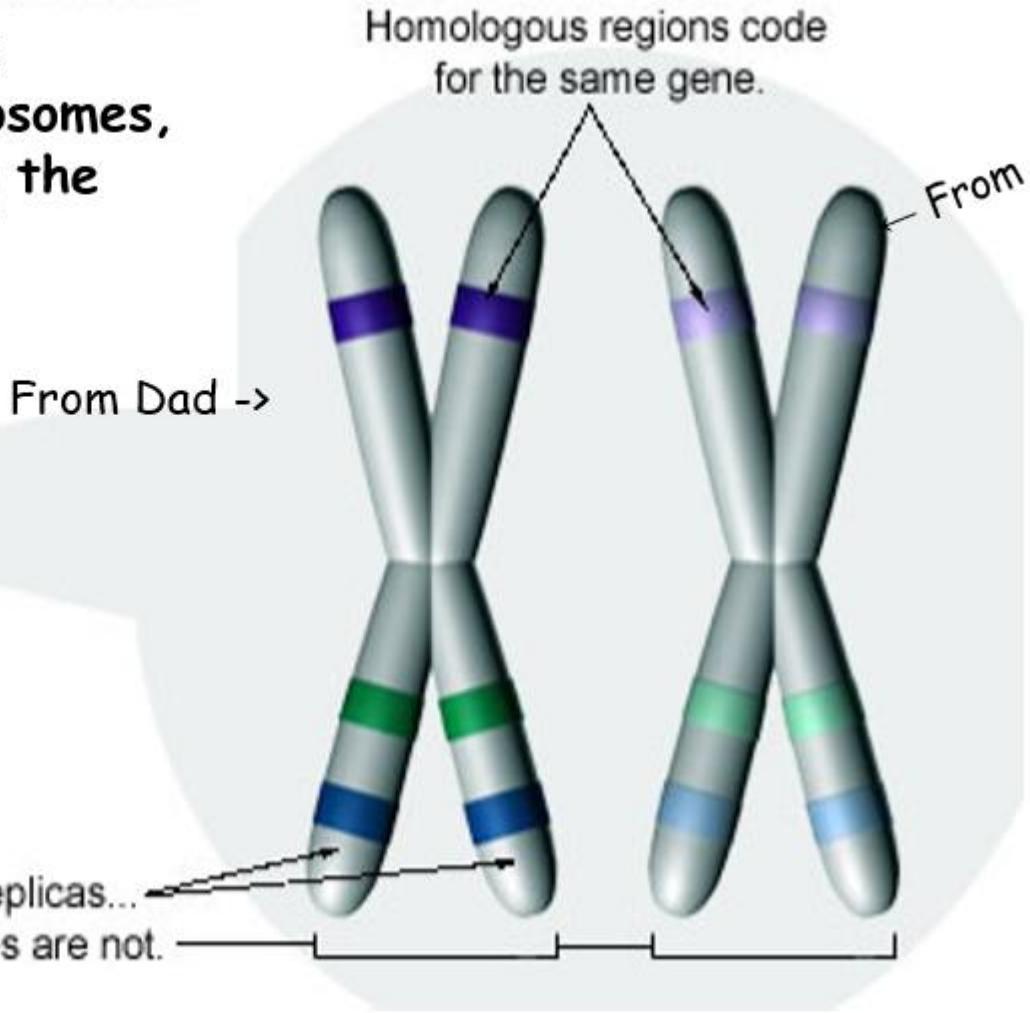
OOGENESIS


human
sex cell
2n=46
diploid (2n)
n=23
n=23
n=23
egg
Haploid
(1n)
Polar
Bodies
(die)
Meiosis I
Meiosis II

HOMOLOGOUS CHROMOSOMES

- Found in Diploid Cells
- Same type of chromosomes, contain same genes in the same places but NOT identical

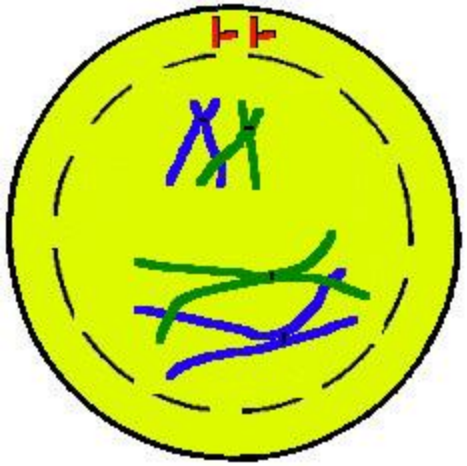




MEIOSIS I (FOUR PHASES)

- **Cell division** that separates homologous chromosomes

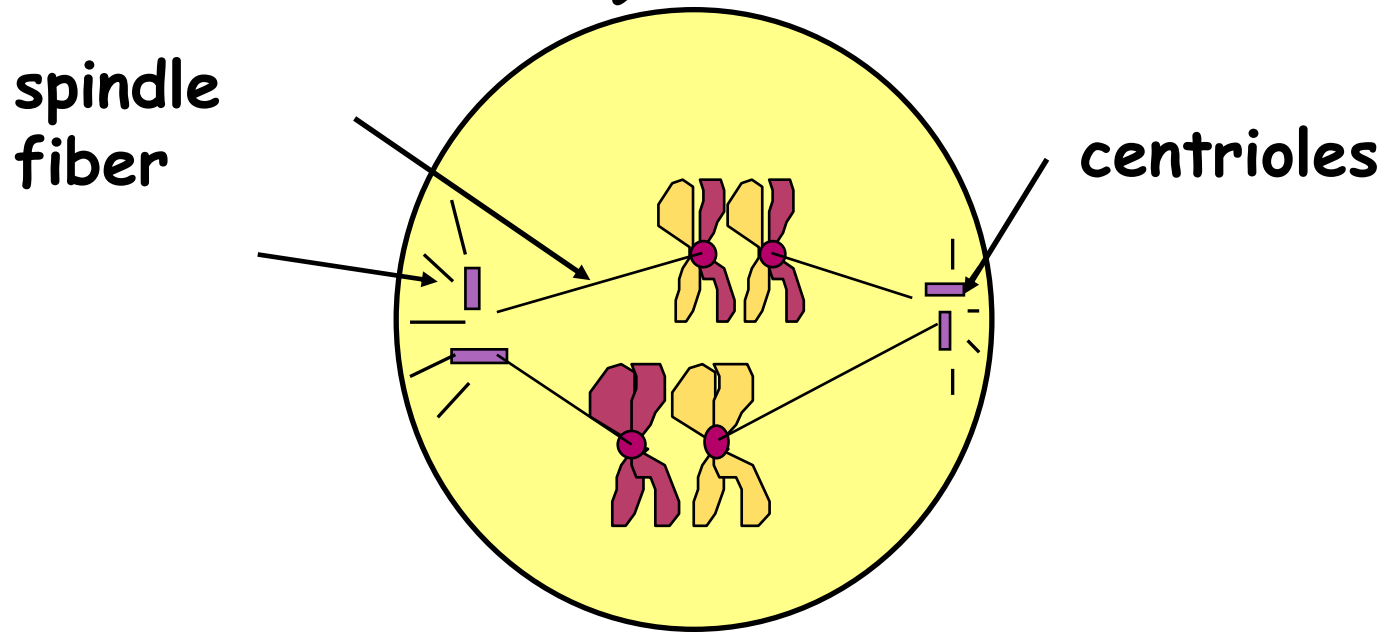
- **Four phases**:
  a. Prophase I
  b. Metaphase I
  c. Anaphase I
  d. Telophase I



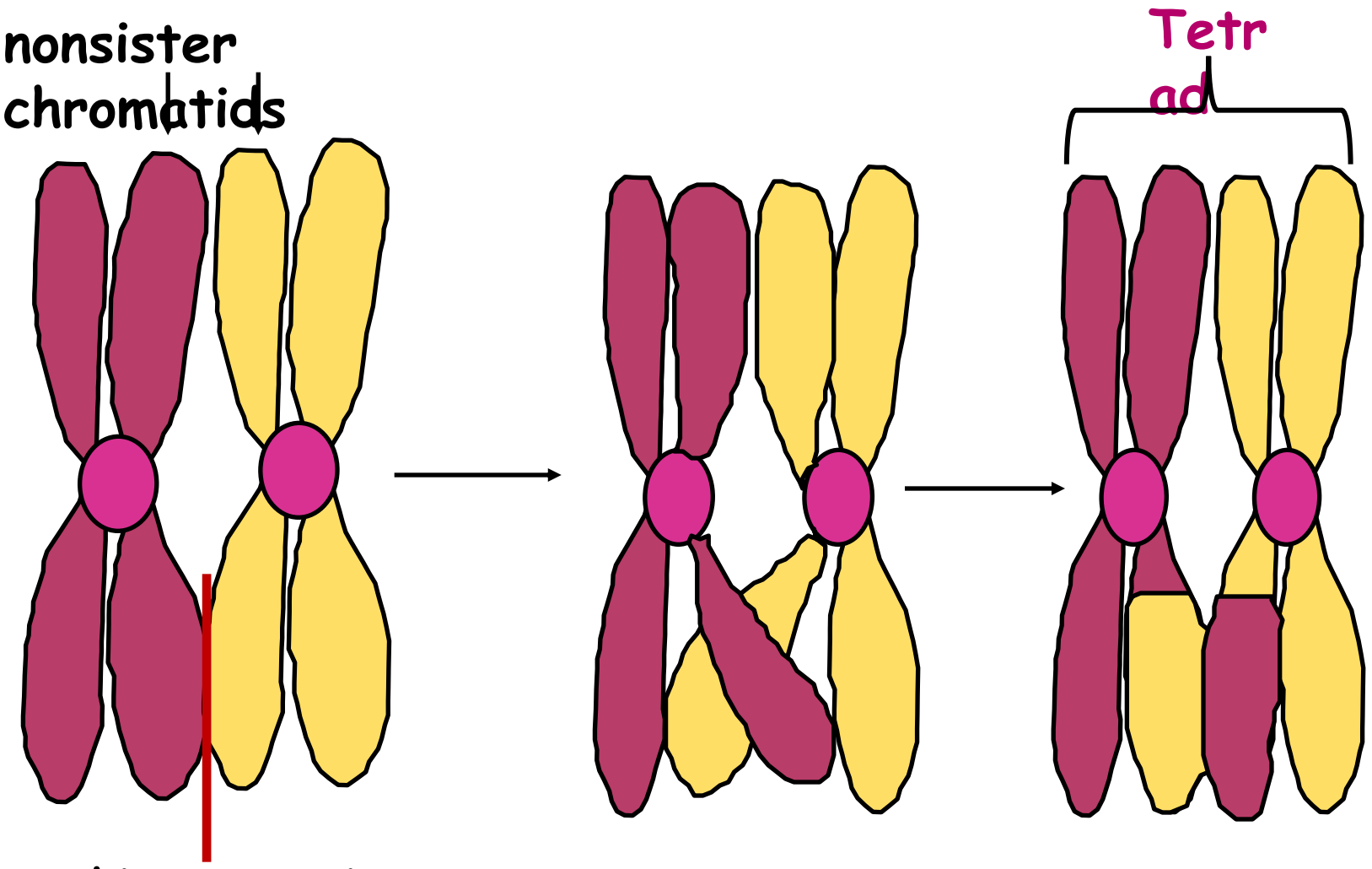
Prophase I

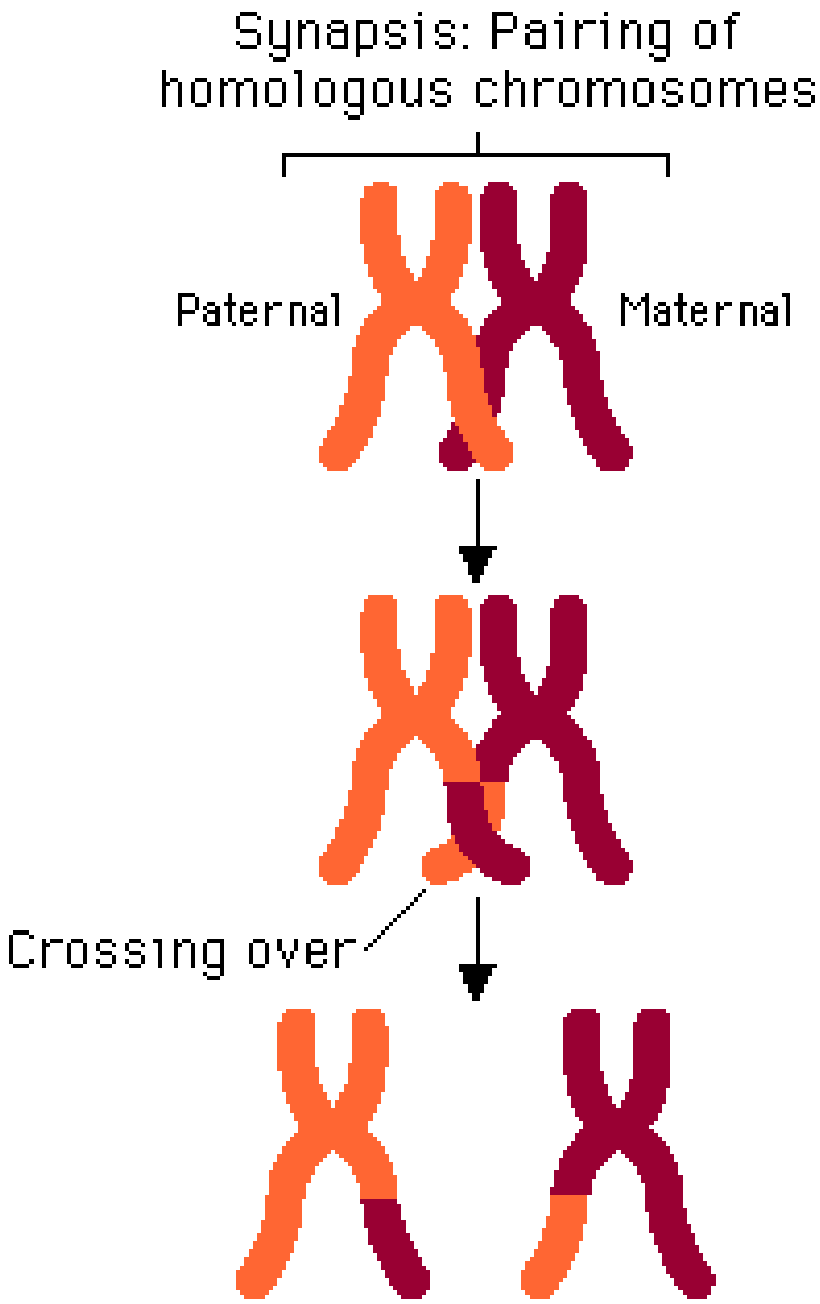
PROPHASE I

- Same as mitosis prophase but homologous chromosomes pair up
- Tetrad is two chromosomes or four chromatids (two sets of sister chromatids).

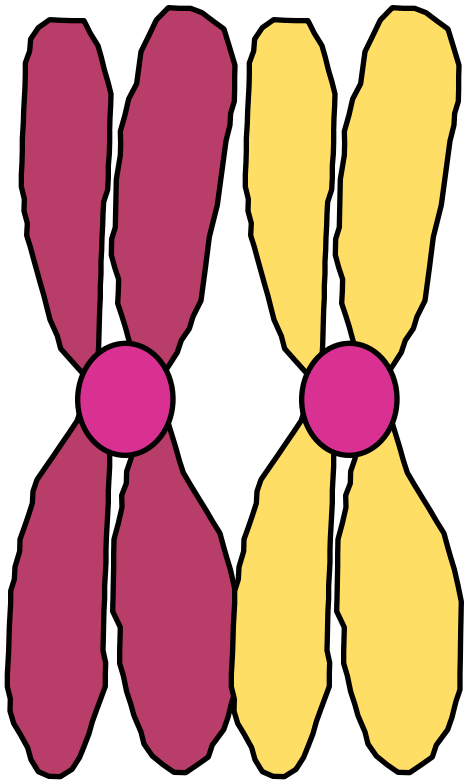


CROSSING OVER

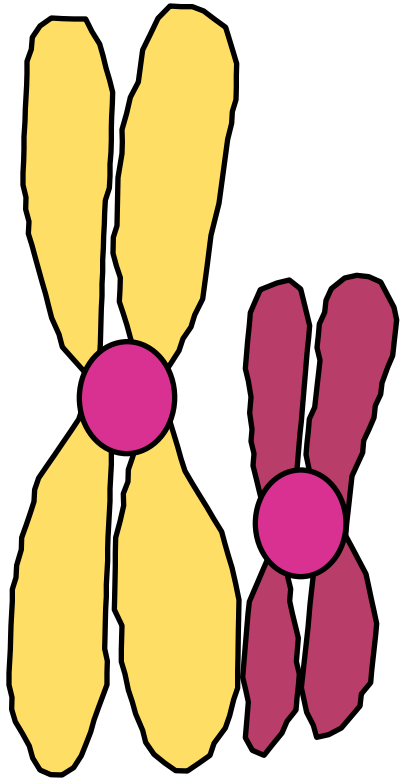



Synapsis: Pairing of homologous chromosomes
Paternal
Maternal
Crossing over

SEX CHROMOSOMES

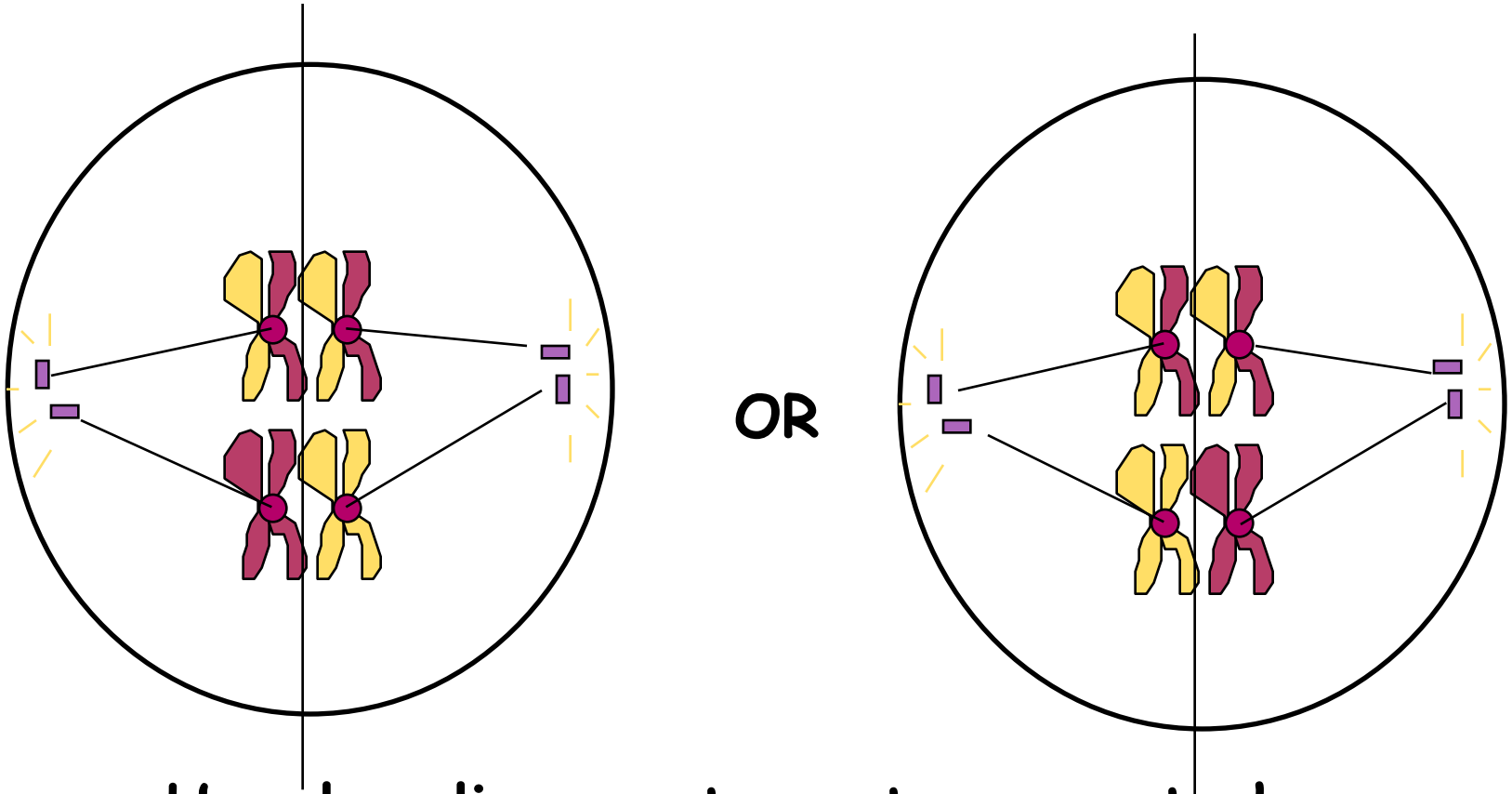


XX chromosome - female



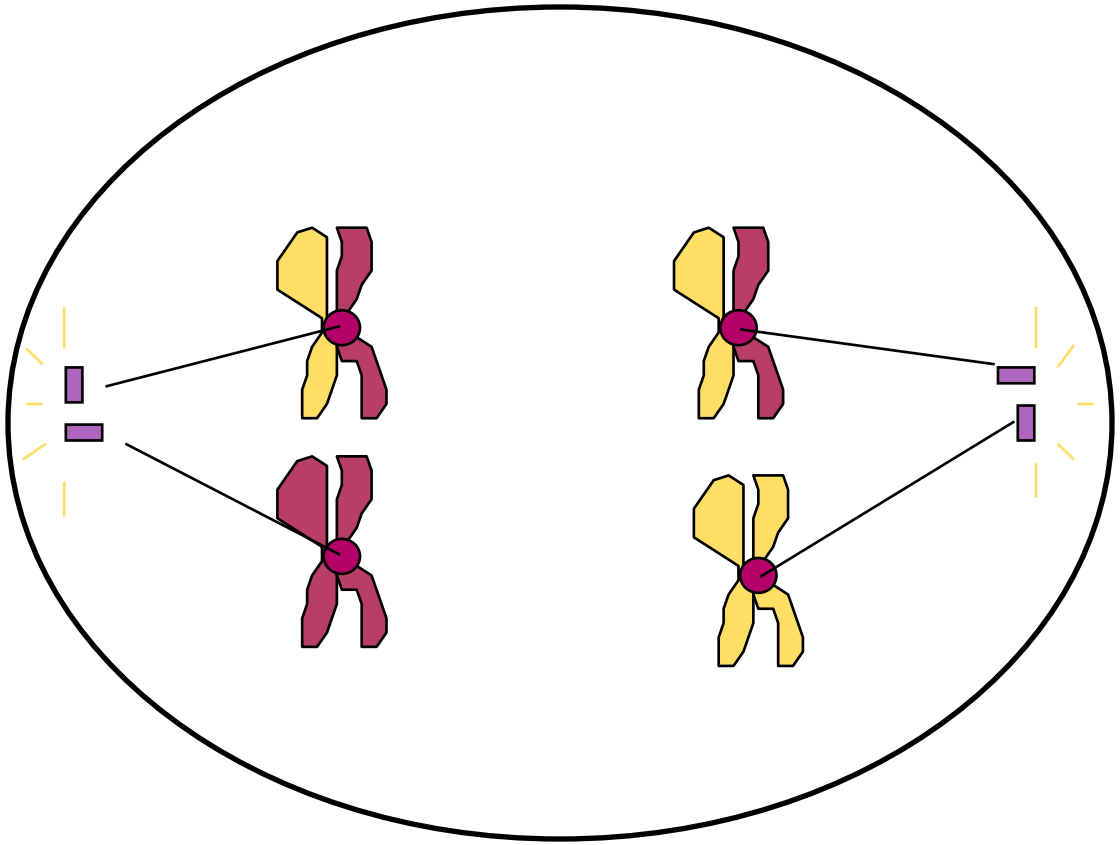
XY chromosome - male

METAPHASE I



Homologs line up at equator or metaphase plate

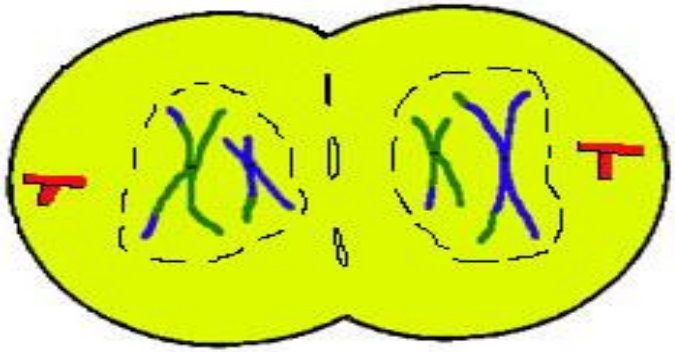
ANAPHASE I



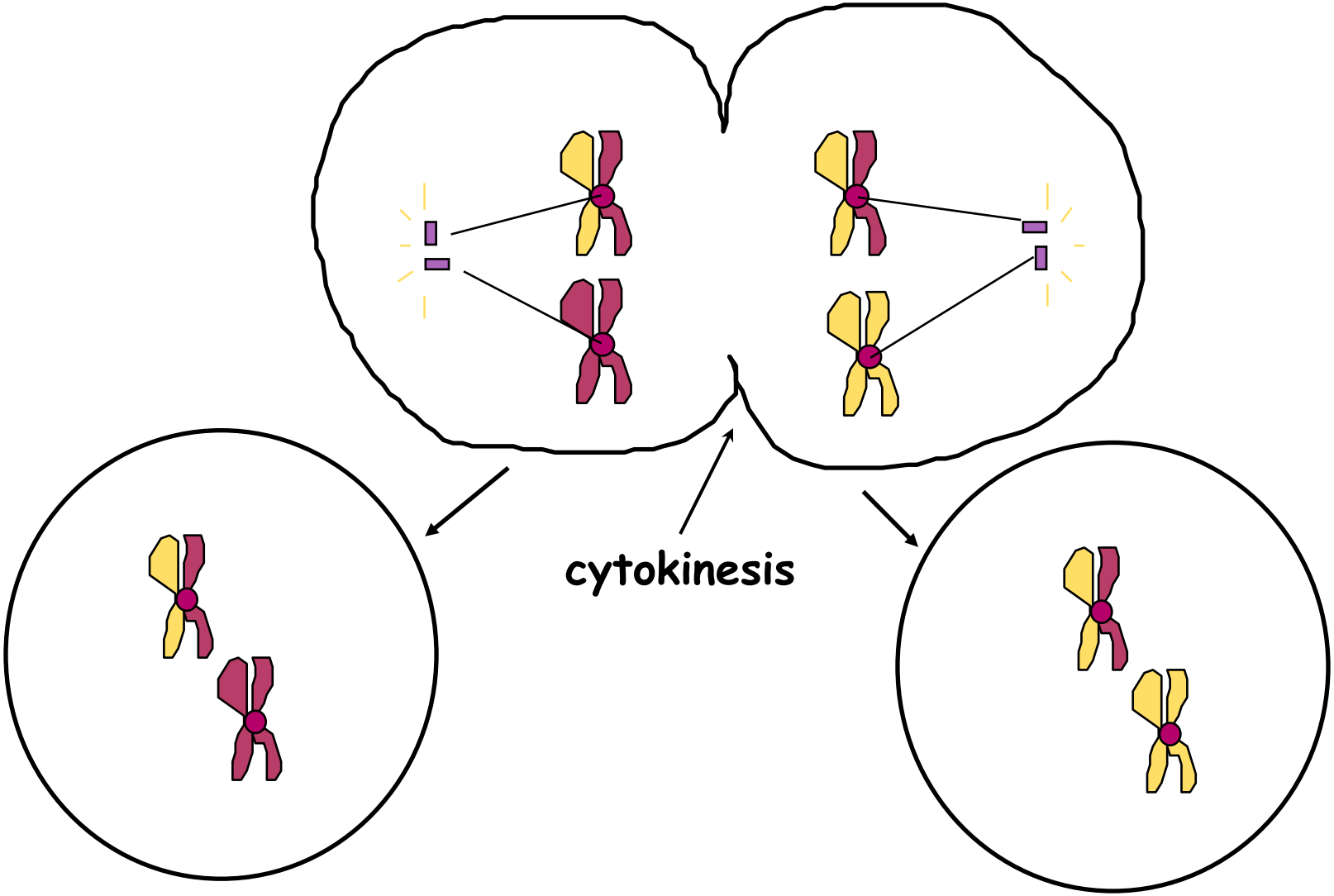
Homologs separate

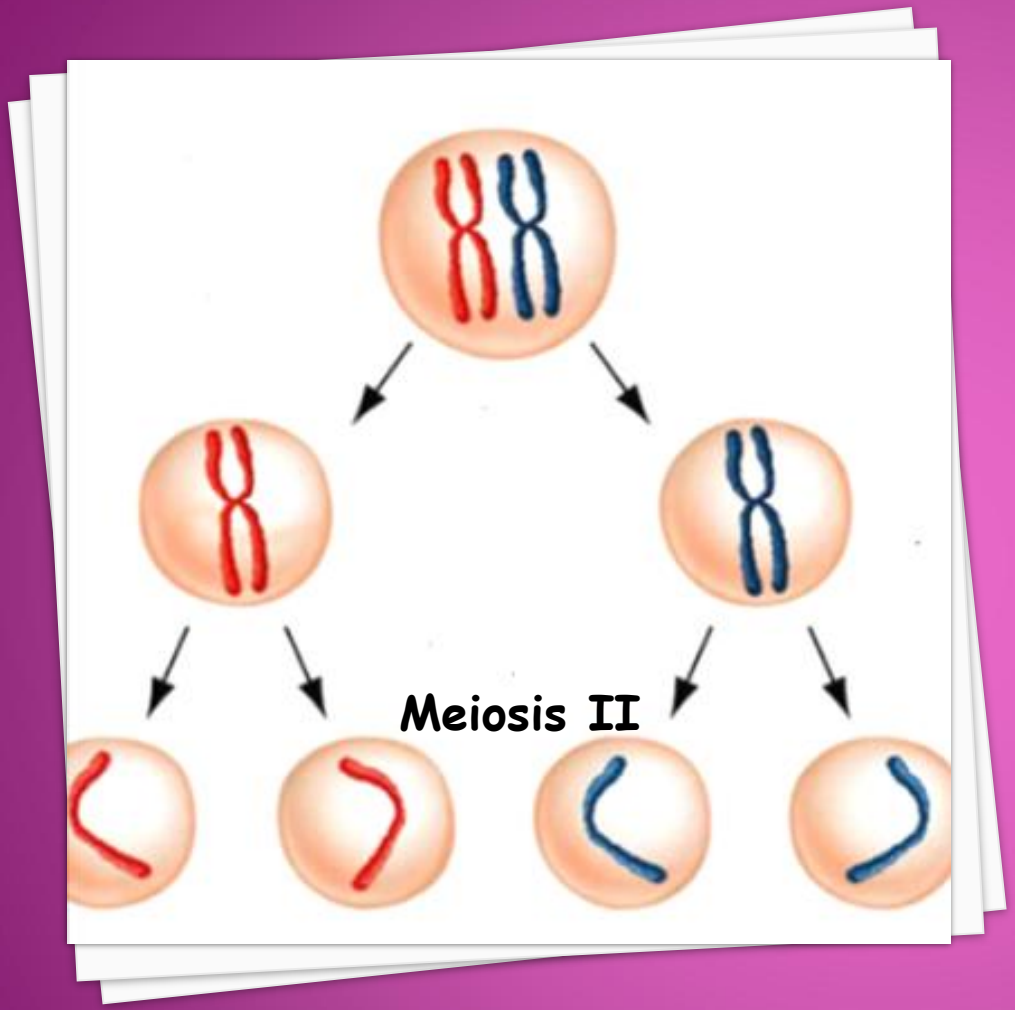
TELOPHASE I

- Each pole now has **haploid** (1n) set of replicated **chromosomes**.
- **Cytokinesis** occurs and two haploid daughter cells are formed.



TELOPHASE I





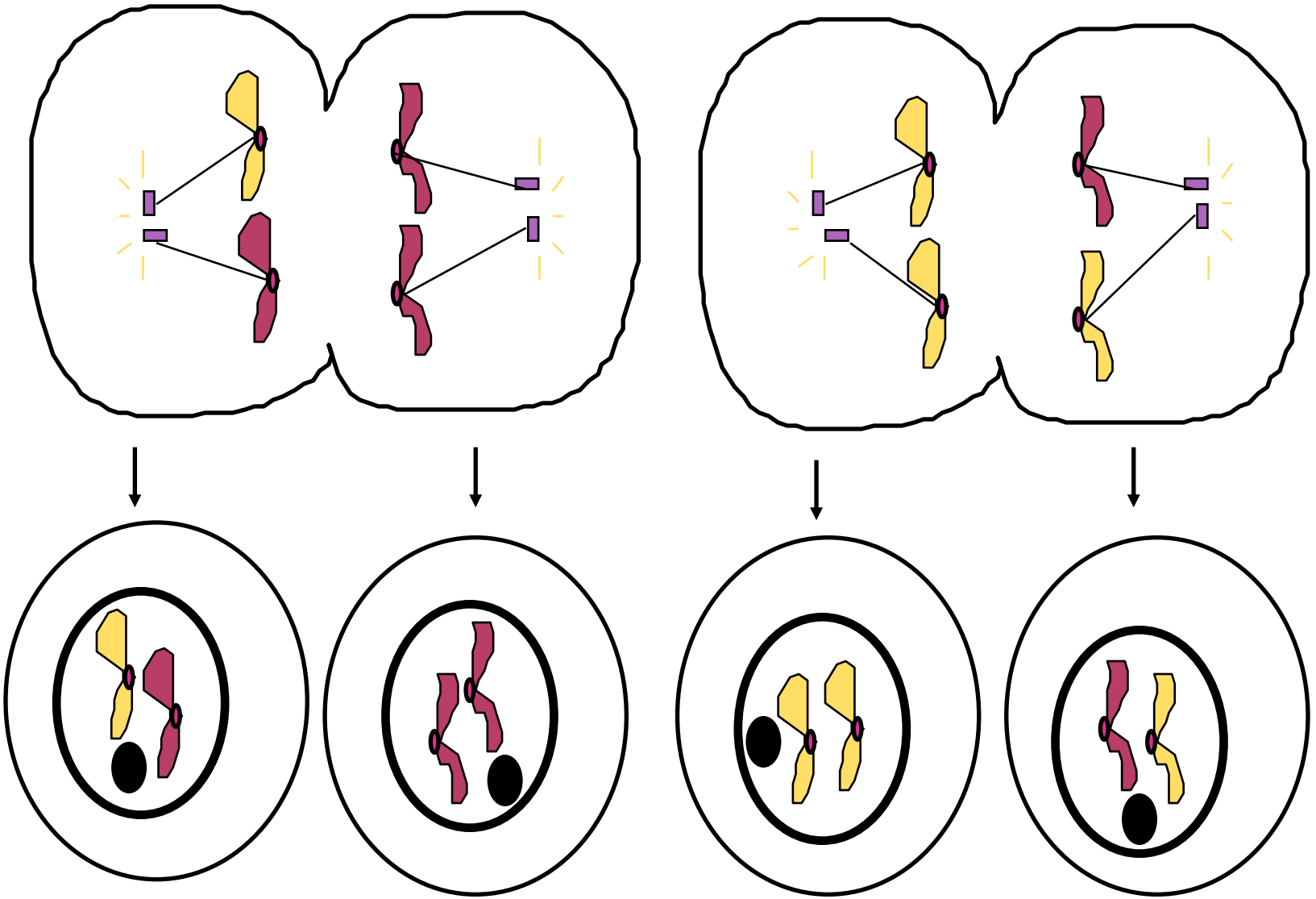
MEIOSIS II

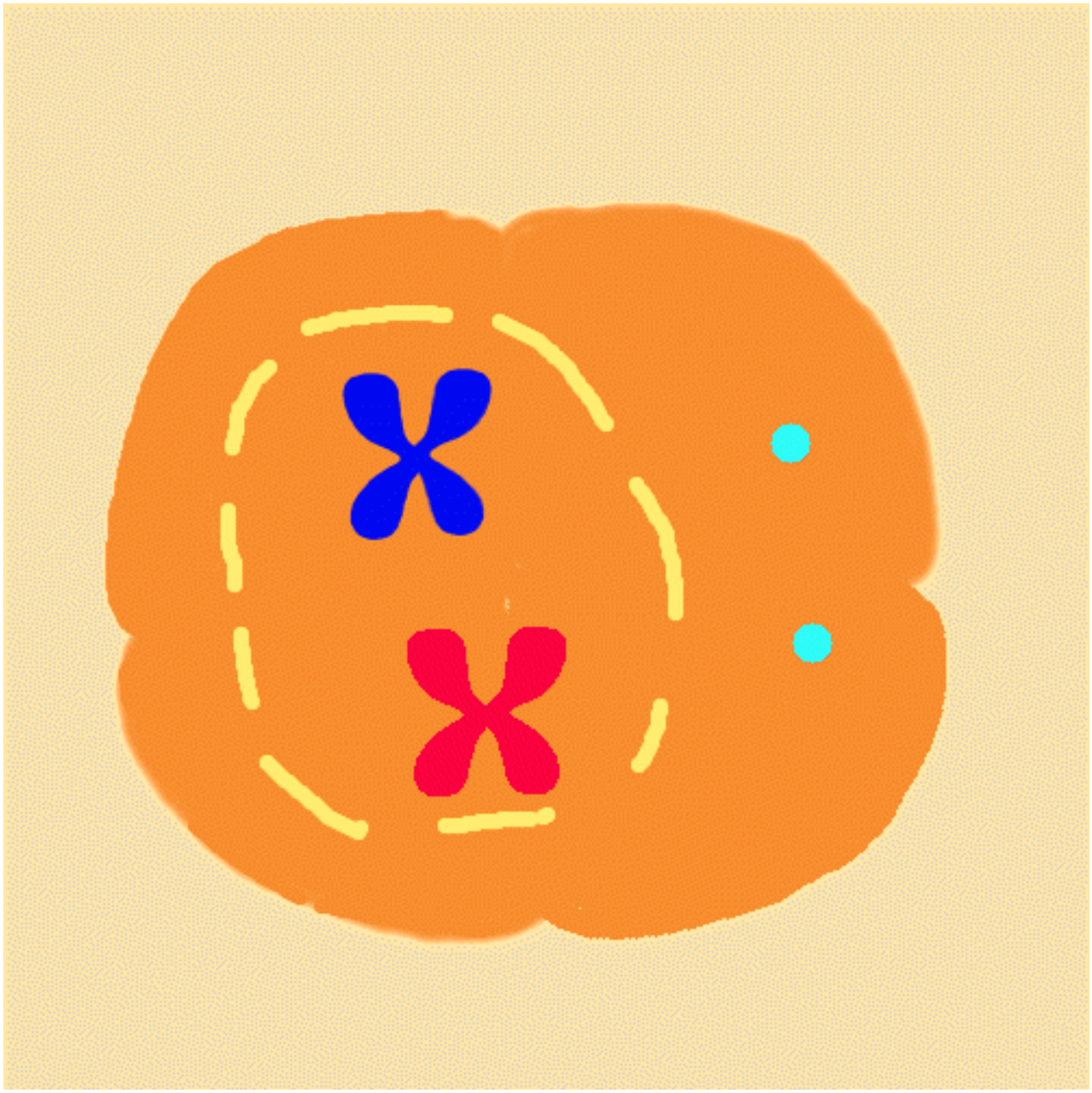
Sister Chromatids Separate

MEIOSIS II

- Sister chromatids separate
- Meiosis II is very similar to mitosis!

TELOPHASE II





QUESTION:

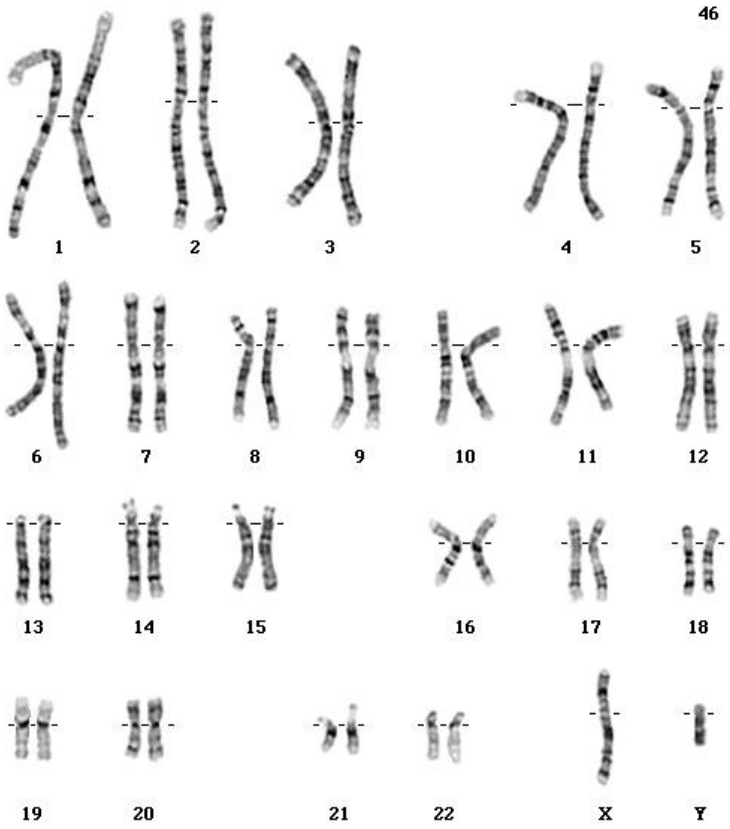
- A cell containing 20 chromosomes (diploid) at the beginning of meiosis would, at its completion, produce cells containing how many chromosomes?

ANSWER:

- 10 chromosomes (haploid or 1n)

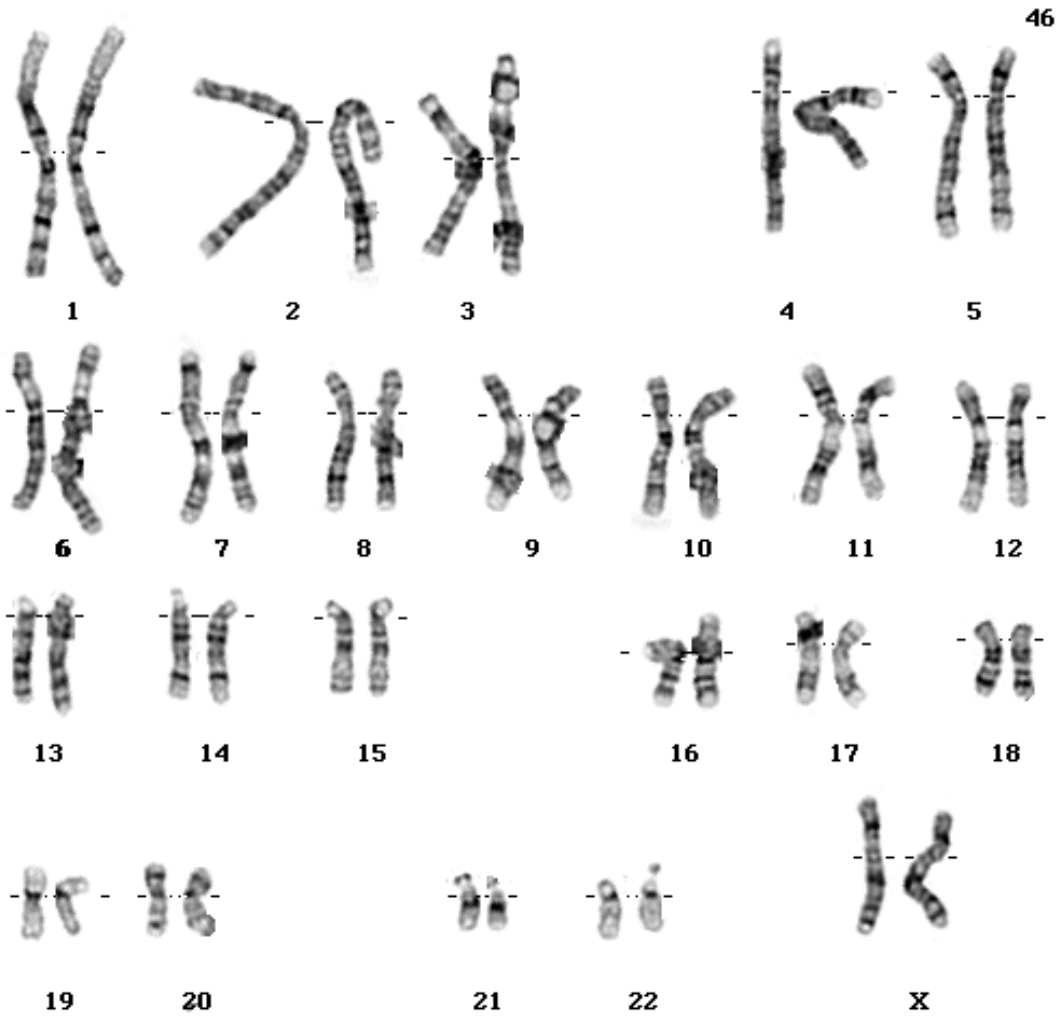
KARYOTYPE

- An organized picture of the chromosomes of a human arranged in pairs by size from largest to smallest.
- Pairs 1-22 called AUTOSOMES
- Last pair are SEX CHROMOSOMES



Male - XY

KARYOTYPE

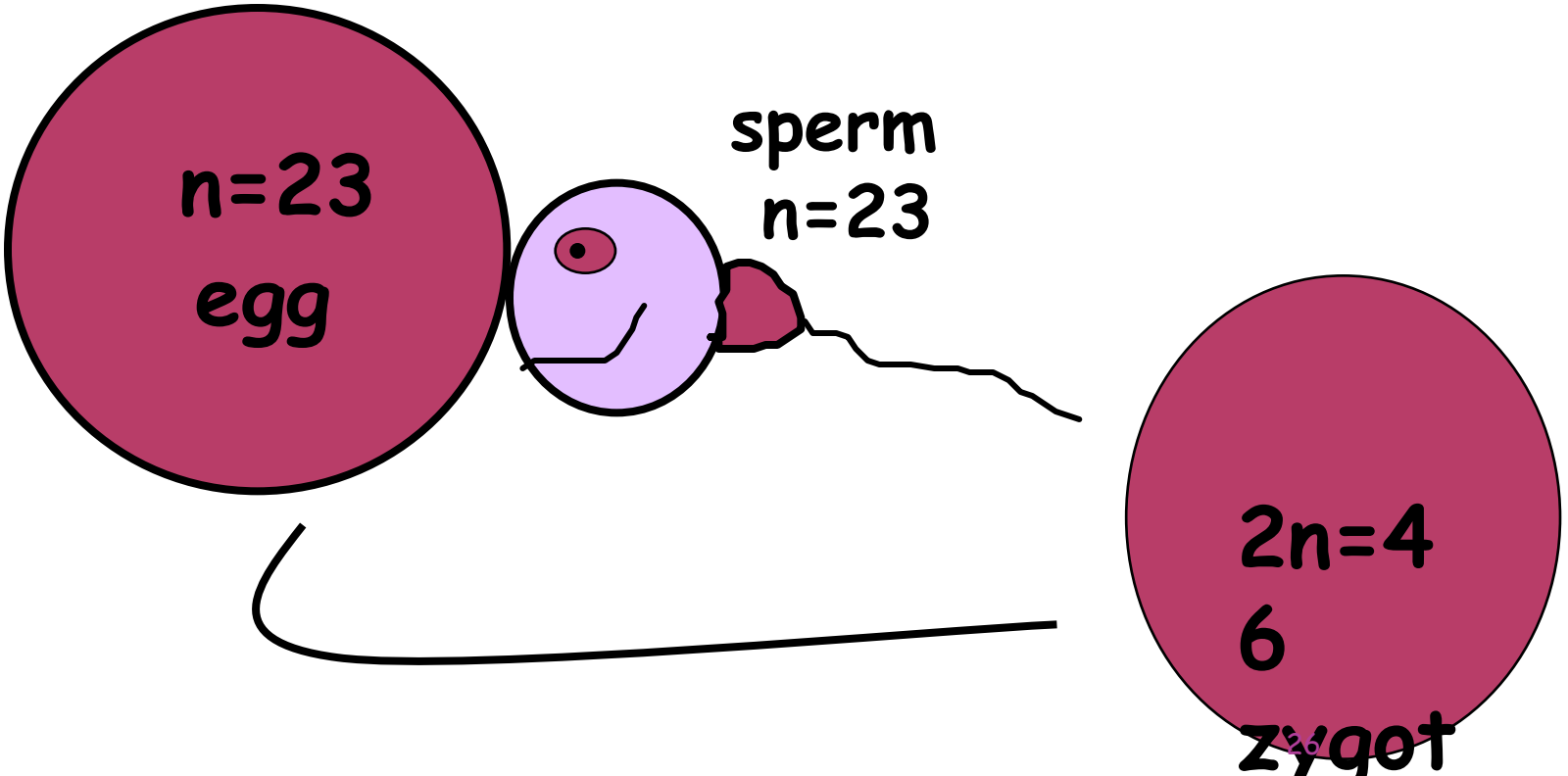


Female - XX

KARYOTYPE

Down Syndrome – Trisomy 21

Female - XX

FERTILIZATION

- The fusion of a sperm and egg to form a zygote.
- A zygote is a FERTILIZED EGG